

## A Cross sectional Analytical study to find out the magnitude of Microalbuminuria in Patients of type 2 Diabetes Mellitus

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### Abstract

**Introduction:** Type 2 diabetes mellitus is associated with significant morbidity and mortality mainly due to cardiovascular complications. Microvascular complications, such as diabetic nephropathy and retinopathy are common. Abnormal levels of urinary albumin excretion are seen in 30-40% of diabetics and is a commonest cause of end stage renal disease. This study was aimed to determine the prevalence of microalbuminuria in type-2 diabetic patients and to evaluate the relation between microalbuminuria and age, sex, duration of diabetes, body mass index. **Methods:** This Cross sectional study involved 100 Subjects of both the genders aged 20 years to 70 years and all classes of socio economic strata attending various local tertiary care hospitals including our Institute. Randomization was done. All patients were subjected to detail history after taking written and informed consent and detail systemic examination. They were subjected to detailed history and physical examination (including vitals, weight, height, and body mass index [BMI]), with special emphasis on the examination of cardiovascular system.

**Results:** Out of the 100 patients, 61 % of the patients had normal albuminuria and 39% of them had microalbuminuria. Male patients were more in both normoalbuminuria and microalbuminuria. Mean age of detection of diabetes among study population was in the early 40s, but the age when microalbuminuria was detected was a little higher. Body mass index was higher in patients with microalbuminuria. Blood pressure was higher among the patients with microalbuminuria compared to normal albuminuria patients. In this study, the biochemical parameters were on the higher among microalbuminuria patients. Neuropathy was commonest complication in both group of patients followed by NPDR in patients with microalbuminuria. **Conclusion:** Prevalence of microalbuminuria was seen in patients with type 2 diabetes. Hypertension, raised HbA1C levels, high blood sugar levels and creatinine clearance levels are the major risk factors. Hence early detection of high risk patients and the early initiation of renal and cardiovascular protective agents helps in reducing morbidity and mortality due to type 2 diabetes mellitus.

**Keyword :** Micro albuminuria , Diabetes Mellitus , Prevalence , Microvascular complications

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### Introduction

Diabetes mellitus is a common endocrine disorder globally and is characterized by insulin resistance, impaired insulin secretion, and increased glucose production[1]. According to World Health

Organization (WHO) there is an increase in the prevalence of diabetes worldwide particularly in developing countries and India has the largest number of diabetic[2,3]. Type 2 diabetes mellitus is associated with significant morbidity and mortality mainly due to cardiovascular complications.

Microvascular complications, such as diabetic nephropathy and retinopathy are common. Abnormal levels of urinary albumin excretion are seen in 30-40% of diabetics and is a commonest cause of end stage renal disease. Proteinuria is also an important

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marker of cardiovascular mortality. The presence of microalbuminuria precedes the development of overt diabetic nephropathy by 10–14 years. It is at this stage that one can hope to reverse diabetic nephropathy or prevent its progression. Therapeutic interventions which reverse microalbuminuria include intensified glycemic control, use of ACE inhibitors, etc. A diagnosis of microalbuminuria can be made by measuring its excretion rate during 24 hours or in an overnight urine collection, or by measuring albumin/creatinine ratio or albumin concentration in the morning or a random urine sample. Determination of UAE in the morning urine sample constitutes the ideal test for screening, and overnight urine collection might be the best choice for monitoring microalbuminuria [4]. Hence in this study we report on the prevalence of microalbuminuria in 100 patients with type 2 Diabetes mellitus who attend the local outpatient of Department of General Medicine at various secondary and tertiary health care units over a period of 4 months. This study was aimed to determine the prevalence of microalbuminuria in type-2 diabetic patients and to evaluate the relation between microalbuminuria and age, sex, duration of diabetes, body mass index, and creatinine clearance.

### Methodology

This was a cross sectional study conducted in a span of 6 months in General Medicine OPDs and Indoor Patients of various local tertiary care hospitals including our Institute . It involved Prior Consent from all the patients & the Hospital Authorities / Medical Superintendent of the tertiary care hospitals. 100 Subjects chosen for the study involving both the genders , aged 20 years to 70 years and all classes of socio economic strata attending various local tertiary care hospitals including our Institute . Randomization was done . All patients were subjected to detail history after taking written and informed consent and detail systemic examination. They were subjected to detailed history and physical examination (including vitals, weight, height, and body mass index [BMI]), with special emphasis on the examination of cardiovascular system.

The exclusion criteria included patients who were having -

- Renal diseases
- Urinary tract infection
- Tobacco use
- Fever (current or within the past on month)
- Serum creatinine >1.5 mg/dl
- Major cardiovascular and cerebrovascular events in the past 6 months such as coronary artery disease (CAD), congestive heart failure (CHF), valvular heart

disease, atrial fibrillation, cerebrovascular accidents, and myocardial infarction & Pregnancy

Patient's history including age, sex, duration of the diabetes was taken. Height and weight and Body Mass Index (BMI) of all patients were calculated. Blood pressure was taken for all the patients for detection of hypertension. Blood was collected for fasting blood sugar, HbA1C, fasting lipid profile levels. Microalbuminuria was assessed using dipstick kits in early morning urine samples

All patients were subjected to following laboratory investigations -

- CBC with ESR
- Urine albumin by dipstick
- Urine routine and microscopic examination
- 24 h urinary albumin
- Blood urea and serum creatinine
- Plasma glucose – fasting and postprandial
- Serum electrolytes–sodium and potassium

Data was filled in Microsoft Excel & analysed using a computer software Epi Info version 6.2 (Atlanta, Georgia, USA) & SPSS .Chi-square test was used to analyze nonparametric or categorical data. For analysis of ordinal scale data, Student's t-test was used. Karl–Pearson correlation coefficient was calculated to observe correlation between variables.  $P < 0.05$  was taken as significant and  $<0.01$  as highly significant.  $P$  value of 0.05 and less was considered as statistically significant. Data collected were analyzed by student's 't' test or chi-square test as appropriate. Pearson correlation test was used to analyze the correlation of microalbuminuria with independent variables like age, sex, BMI, duration of diabetes, and creatinine clearance. Probability (P) value less than 0.05 was regarded as statistically significant.

### Results

Out of the 100 patients, 61 % of the patients had normal albuminuria and 39% of them had microalbuminuria. Out of 100 subjects 59 were males. In our study male patients were more in both normoalbuminuria and microalbuminuria. 52% of the males had normoalbuminuria while 54% had microalbuminuria Mean age of detection of diabetes among study population was in the early 40s, but the age when microalbuminuria was detected was a little higher. Body mass index was higher in patients with microalbuminuria. Blood pressure was higher among the patients with microalbuminuria compared to normal albuminuria patients. In this study, the biochemical parameters were on the higher among microalbuminuria patients (Table 2).The difference

were Statistically significant ( p value less than 0.05) .  
Neuropathy was commonest complication in both

group of patients followed by NPDR in patients with  
microalbuminuria

**Table 1:Demographic details of the patients**

	Normal Albuminuria (n=61)	Microalbuminuria (n=39)
Age	43	51
Age at Diagnosis	41	55
Duration of Diabetes	4 years	8 years
Body Mass Index	26.4	29.2

**Table 2:Other risk factors**

	Normal (n=61)	Microalbuminuria (n=39)
Systolic BP	124 mm of Hg	140 mm of Hg
Diastolic BP	76 mm of Hg	94 mm of Hg
Fasting blood sugar	105 mg/dl	177 mg/dl
HBA1c	5.9 %	7.8%
Creatinine	0.9	1.4
Total Cholesterol	170	267

## Discussion

Incidence of diabetes mellitus has increased drastically over past decade[5]. Various studies have shown marked variation in the prevalence of microalbuminuria [6-10]. Especially Indians have a higher prevalence of microalbuminuria [8-10]. Microvascular complications such as nephropathy has also increase the prevalence of chronic kidney disease [11-14].

In our study, the incidence of microalbuminuria was 39% with increased incidence in males compared to females. Present study has shown statically significant linear relationship of degree of albuminuria with age. Earlier studies have also shown positive correlation of microalbuminuria with age of the patients. The average age of onset of diabetes was in the late 40's, while microalbuminuria was detected much later, in the early 50's. Various studies have reported similar incidence of microalbuminuria in diabetes. Vijay et al showed incidence of 15.7% in Chennai. [15] Gupta et al from North India in his study reported an incidence of 26.5% microalbuminuria in patients with type 2 diabetic mellitus.16 Globally, 16.8% in Saudi Arabia, 7-9% in UK, 31% in Mexican Americans was reported.17-20 In our study poor glycaemic control, duration of diabetes, hypertension, increasing age, high HbA1C are most important risk factors for microalbuminuria. Vijay et al have reported duration of diabetes, systolic and diastolic BP age and serum creatinine levels to be associated with proteinuria. [15] According to John et al, male gender, increasing age, duration of diabetes,

poor glycaemic control and raised blood pressure was associated with microalbuminuria.[21] In study conducted by Verghese et al, age, duration of diabetes, diastolic blood pressure, HbA1C, and fasting plasma glucose were reported to be the risk factors[22].Present study has shown positive correlation of microalbuminuria with duration of diabetes mellitus which is in accordance with many previous reports.

Duration of diabetes has significant contribution for the development microalbuminuria by prolonged exposure to hyperglycemia-induced advanced glycosylation end products accumulations. Control of diabetes with regular treatment also plays a significant role in the development of diabetic nephropathy.Limitations of the present study must also be considered. As our study was not based on the general population, selection bias might have affected the outcome of the study. Larger sample size in general population may be required to confirm the results of the present study.

## Conclusion

Prevalence of microalbuminuria was seen in patients with type 2 diabetes. Hypertension, raised HbA1C levels, high blood sugar levels and creatinine clearance levels are the major risk factors. Hence early detection of high risk patients and the early initiation of renal and cardiovascular protective agents helps in reducing morbidity and mortality due to type 2 diabetes mellites.

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